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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/733,754	12/11/2003	Harvey G. Kiel	ROC920030306US1	8410
30206	7590	11/20/2008	EXAMINER	
IBM CORPORATION ROCHESTER IP LAW DEPT. 917 3605 HIGHWAY 52 NORTH ROCHESTER, MN 55901-7829			THOMPSON, JR, OTIS L	
			ART UNIT	PAPER NUMBER
			2419	
			MAIL DATE	DELIVERY MODE
			11/20/2008	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/733,754	<b>Applicant(s)</b> KIEL ET AL.	
	<b>Examiner</b> OTIS L. THOMPSON, JR	<b>Art Unit</b> 2419	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16,35-37 and 41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10,12,35-37 and 41 is/are rejected.
- 7) ☒ Claim(s) 11 and 13-16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

***Response to Arguments***

1. Applicant's arguments with respect to claim 1-16, 35-37, and 41 have been considered but are moot in view of the new ground(s) of rejection. See Detailed Action below for new grounds of rejection.

**DETAILED ACTION**

***Claim Objections***

2. Claim 13 is objected to because of the following informalities: in the phrase "sending the address of the selected partition to firmware of the computer system", it appears that the word "the" is missing before the word "firmware". Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3, 4, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gioquindo et al. (US 2002/0029286 A1) in view of Schmidt (US 2003/0079067 A1).

5. **Regarding claim 1**, Gioquindo et al. discloses a method for sharing a multiple queue Ethernet adapter comprising:

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- a. *Receiving a frame or packet in the adapter* (Paragraph 0052, see “...packet is received from the Host, the destination IP address is “looked up” in the ARP tables...”, i.e. the packet is received at the OSA adapter in figure 3 label 120);
- b. *Determining whether the frame or packet is for one or more of a plurality of partitions that share the adapter* (Paragraph 0052, see “...destination IP address is “looked up” in the ARP tables...If an entry is found and is marked as a HOME entry...”; Paragraph 0049, see “...saving “HOME” IP addresses within the communications adapter...”; Paragraph 0050, “...“HOME” address are those which are recognized as local IP addresses...”, i.e. IP address of a packet is looked up to see if the destination indicates a partition that shares the adapter);
- c. *If the frame or packet is for one or more of the plurality of partitions that share the adapter:*
  - i. *Determining one or more of the plurality of partitions to which the frame is to be sent* (Paragraph 0052, see “...destination IP address is “looked up” in the ARP tables...If an entry is found and is marked as a HOME entry...”);
  - ii. *Transferring the frame or packet directly to each of the one or more partitions to which the frame or packet is to be sent* (Paragraph 0052, see “...then the IP packet is routed directly to the LPAR owning that address...”).

Gioquindo et al. does not specifically disclose *storing the frame or packet in an adapter cache memory*, however, Gioquindo et al. does disclose ARP Cache 123 in figure 3 which would obviously exist in the adapter's cache memory as is well known in the art. Furthermore, since cache is well known in the art as being temporary storage space and the adapter performs a lookup of a destination IP address of a received packet in the ARP tables contained in the adapter, it also obvious that the adapter would *temporarily store the received packet in cache memory* in order to perform the lookup of the destination IP address. Gioquindo et al. also does not specifically disclose *transferring the frame or packet from the adapter cache memory*, however, since the adapter receives the packet, performs IP address lookup, and routes the packet to the indicated partition, it is obvious that the packet would be *transferred from the adapter cache memory* because the adapter has to temporarily store the packet in order to be able to perform the lookup. Therefore, it would have been obvious to one of ordinary skill in the art to modify the invention of Gioquindo et al. to include the adapter cache memory and the steps of storing the packet in the adapter cache memory and transferring the packet from the adapter cache memory in order for the adapter to be able to adequately perform lookup of a destination address of the received packet.

Gioquindo et al. does not specifically discloses that a packet is transferred from adapter cache memory directly to *a receive queue of each of the one or more partitions to which the frame or packet is to be sent*. However, Schmidt discloses a partitioned computer system in which device drivers are used to drive data exchanges between partitions. Schmidt further discloses that a device driver that is employed by a partition

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has a send queue and a receive or target queue (Figure 2 Send Queue 222 and Receive Queue 220), wherein the receive queue is used for receiving data which is addressed thereto (Paragraph 0044, see all).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to incorporate the teachings of Schmidt into Gioquindo et al. in order to allow a partition to receive data through its respective receive queue.

6. **Regarding claim 3**, Gioquindo et al. in view of Schmidt discloses *accessing a table stored in the adapter and determining one or more of the plurality of partitions to which the frame or packet is to be sent based on data stored in the table* (Gioquindo et al., Paragraph 0052, see "...destination IP address is "looked up" in the ARP tables...If an entry is found and is marked as a HOME entry...").

7. **Regarding claim 4**, Gioquindo et al. in view of Schmidt discloses *determining one or more of the plurality of partitions to which the frame or packet is to be sent based on at least one of a MAC address, VLAN ID/MAC address pair, and an IP address stored in the table* (Gioquindo et al., Paragraph 0052, see "...destination IP address is "looked up" in the ARP tables...If an entry is found and is marked as a HOME entry...").

8. **Regarding claim 10**, Gioquindo et al. discloses *a method of sharing a multiple queue Ethernet adapter comprising:*

d. *Transferring a frame or packet from a sending partition to the adapter* (Paragraph 0052 "...packet is received from the Host, the destination IP address is "looked up" in the ARP tables...", i.e. the packet is received at the OSA adapter

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in figure 3 label 120) *and transferring a frame or packet from the adapter directly to the receiving partition* (Paragraph 0052, see "...destination IP address is "looked up" in the ARP tables...If an entry is found and is marked as a HOME entry then the IP packet is routed directly to the LPAR owning that address...").

Gioquindo et al. does not specifically disclose transferring a frame or packet to the *adapter cache memory*, however, Gioquindo et al. does disclose ARP Cache 123 in figure 3 which would obviously exist in the adapter's cache memory as is well known in the art. Furthermore, since cache is well known in the art as being temporary storage space and the adapter performs a lookup of a destination IP address of a received packet in the ARP tables contained in the adapter, it also obvious that the adapter would *temporarily store the received packet in cache memory* in order to perform the lookup of the destination IP address. Gioquindo et al. also does not specifically disclose *transferring the frame or packet from the adapter cache memory*, however, since the adapter receives the packet, performs IP address lookup, and routes the packet to the indicated partition, it is obvious that the packet would be *transferred from the adapter cache memory* because the adapter has to temporarily store the packet in order to be able to perform the lookup. Therefore, it would have been obvious to one of ordinary skill in the art to modify the invention of Gioquindo et al. to include the adapter cache memory and the steps of storing the packet in the adapter cache memory and transferring the packet from the adapter cache memory in order for the adapter to be able to adequately perform lookup of a destination address of the received packet.

Gioquindo et al. does not specifically disclose *employing a receive queue and a transmit queue for each of a plurality of partitions included in a computer system and transferring a frame or packet from the transmit queue of one of the plurality of partitions, and transferring a frame or packet from the adapter to the receive queue of one of the plurality of partitions*. However, Schmidt discloses a partitioned computer system in which device drivers are used to drive data exchanges between partitions. Schmidt further discloses that a device driver that is employed by a partition has a send queue and a receive or target queue (Figure 2 Send Queue 222 and Receive Queue 220), wherein the send queue is used for sending data from a respective partition and the receive queue is used for receiving data which is addressed to a respective partition (Paragraph 0044, see all).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to incorporate the teachings of Schmidt into Gioquindo et al. in order to allow partitions to send and receive data through their respective send and receive queues.

9. Claims 2 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gioquindo et al. in view of Schmidt as applied to claim 1 above, and further in view of Gulick et al. (US 6,314,501 B1).

10. **Regarding claim 2 and 36**, Gioquindo et al. in view Schmidt discloses the claimed invention above but fails to specifically disclose *generating an interrupt*



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*(Message Signaling Interrupt, MSI) to notify each of the one or more partitions to which the frame or packet is transferred of the frame or packet.*

However, Gulick et al. discloses a partitioned computer system allowing partitions to communicate with each other using a shared memory, in which an interrupt is generated to a receiving partition in order to signal the partition that information is being transferred to it (Column 3 lines 5-15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to incorporate the teachings of Gulick et al. into the system of Gioquindo et al. in view of Schmidt in order to notify a receiving partition that data is being transferred to it.

11. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gioquindo et al. in view of Schmidt as applied to claim 1 above, and further in view of Gulick et al.

12. **Regarding claim 35**, Gioquindo et al. in view of Schmidt discloses the claimed invention above but fails to specifically disclose *determining whether the frame or packet is a broadcast frame or packet and transferring the broadcast frame or packet to a receive queue of all of the plurality of partitions.*

However Gulick et al. discloses *determining whether the frame or packet is a broadcast frame or packet and transferring the broadcast frame or packet to a receive queue of all of the plurality of partitions* (Gulick et al., Column 53 lines 40-50, see "...packets with broadcast or multicast MAC address are copied into as many shared

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memory buffers as necessary to send directly to each partition...”; Column 4 lines 43-61, see “...output queue for a given partition indicates whether that partition has placed in the shared memory window any communications intended for any of the other partitions...”). Gulick et al. is advantageous in that it allows multiple partitions to share memory (See Abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant’s invention was made to incorporate the teachings of Gulick et al. into Gioquindo et al. in order to allow multiple partitions in a partitioned computer system to share memory.

13. Claims 6, 7, 37, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gioquindo et al. in view of Gulick et al.

14. **Regarding claim 6**, Gioquindo et al. discloses *a method for sharing a multiple queue Ethernet adapter* (Figure 3 see LPAR1, LPAR2, and LPAR3 sharing OSA Adapter 120) *comprising:*

e. *Transferring the frame or packet corresponding to the selected partition directly to the adapter* (Paragraph 0052 “...packet is received from the Host, the destination IP address is “looked up” in the ARP tables...”, i.e. the packet is received at the OSA adapter in figure 3 label 120) *and transmitting the frame or packet from the adapter* (Paragraph 0052, see “...destination IP address is “looked up” in the ARP tables...If an entry is found and is marked as a HOME entry then the IP packet is routed directly to the LPAR owning that address...”).

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Gioquindo et al. does not specifically disclose transferring a frame or packet to the *adapter cache memory*, however, Gioquindo et al. does disclose ARP Cache 123 in figure 3 which would obviously exist in the adapter's cache memory as is well known in the art. Furthermore, since cache is well known in the art as being temporary storage space and the adapter performs a lookup of a destination IP address of a received packet in the ARP tables contained in the adapter, it also obvious that the adapter would temporarily store the received packet in cache memory in order to perform the lookup of the destination IP address. Therefore, it would have been obvious to one of ordinary skill in the art to modify the invention of Gioquindo et al. to include the adapter cache memory and the step of transferring the packet to the adapter cache memory in order for the adapter to be able to adequately perform lookup of a destination address of the received packet.

Gioquindo et al. does not specifically disclose *determining whether one or more of a plurality of partitions have a frame or packet to transmit*, with the transferring of the frame or packet to cache memory being based on this determination and the transferring being performed from *a transmit queue* of the selected partition, and *selecting a partition from the plurality of partitions that have a frame or packet to transmit*.

However, Gulick et al. discloses a partitioned computer system allowing partitions to communicate with each other using a shared memory in which output queues, contained in shared memory, for each partition are polled to determine whether a partition's output queue (i.e. *transfer is being performed from transmit queue of a*

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*partition*) has data that is intended for another partition in the system (Column 4 lines 43-61). The *selection of a partition to transmit* is obvious because only one output queue at a time, of the plurality of output queues being polled corresponding to the plurality of partitions, can be allowed to transmit to the receiving queue of a receiving partition. Gulick et al. is advantageous in that it allows multiple partitions to share memory (See Abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to incorporate the teachings of Gulick et al. into Gioquindo et al. in order to allow multiple partitions in a partitioned computer system to share memory.

15. **Regarding claim 7**, Gioquindo et al. in view of Gulick et al. discloses *polling a transmit queue corresponding to each of the plurality of partitions* (Gulick et al., Column 4 lines 43-61, see "...area that is polled...comprises a plurality of output queues, one for each partition...") *and determining whether one or more of the plurality of partitions have a frame or packet to transmit based on polling results from one or more of the plurality of partitions* (Gulick et al., Column 4 lines 43-61, see "...output queue for a given partition indicates whether that partition has placed in the shared memory window any communications intended for any of the other partitions...").

16. **Regarding claim 37**, Gioquindo et al. in view of Gulick et al. discloses *determining if the frame or packet is a broadcast frame or packet and transferring the broadcast frame or packet to the receive queue of all partitions except for the selected partition* (Gulick et al., Column 53 lines 40-50, see "...packets with broadcast or

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multicast MAC address are copied into as many shared memory buffers as necessary to send directly to each partition...”; Column 4 lines 43-61, see “...output queue for a given partition indicates whether that partition has placed in the shared memory window any communications intended for any of the other partitions...”).

17. **Regarding claim 41**, Gioquindo et al. in view of Gulick et al. discloses that *transmitting the frame or packet from the adapter includes transmitting the frame or packet using a network connection* (Gioquindo et al., Abstract, see “...forwarding an IP datagram across the network to one of the clients from a partition of the host system...”)  
*or transmitting the frame or packet to one or more of the plurality of partitions* (Gioquindo et al., Abstract, see “...partition-to-partition communication of IP datagrams...”).

18. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gioquindo et al. in view of Gulick et al. as applied to claim 6 above, and further in view of Condon (US 5,956,714).

19. **Regarding claims 8 and 9**, Gioquindo et al. in view of Gulick et al. discloses *accessing a table stored in the adapter* (Gioquindo et al., Paragraph 0052 “...packet is received from the Host, the destination IP address is “looked up” in the ARP tables...”)  
but does not specifically disclose *selecting a partition from the plurality of partitions that have a frame or packet to transmit based on data stored in the table and based on a priority value stored in the table.*

However, Condon discloses various types of queues that may be implemented in a logically partitioned computer system, for example time based, priority based, and FIFO based queues. Priority based queues give certain items a higher priority with respect to other items on the queue. Items having a high priority are dequeued before items at the front of the queue (i.e. *based on data stored in the table and based on a priority value*) (Column 4, lines 40-42 and 50-53).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to combine the teachings of Condon into the system of Gioquindo et al. in view of Gulick et al. in order to manipulate items sent between logical partitions.

20. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gioquindo et al. in view of McMichael et al. (US 2003/0023826 A1), and further in view of Fernandes et al.

21. **Regarding claim 12**, Gioquindo et al. discloses *a method of configure a plurality of partitions of a computer system to share a multiple queue Ethernet adapter* (See Figure 3 for LPAR 1, LPAR 2, and LPAR 3 sharing OSA Adapter 120) *comprising:*

- f. *Allowing the partitions to directly share the adapter* (Abstract, see "...host channel connection coupling the multiple partitions of the host system to a communications adapter...").

Gioquindo et al. does not specifically disclose *creating a new partition in the computer system*, however McMichael et al. discloses a partition computer system in

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which a partition manager enables the dynamic creation of logical volumes (See Abstract). The partition manager fulfills the need for an OS that supports dynamic changes in the characteristics of physical devices underlying logical volumes without requiring higher layers of the OS and user applications to modify the addresses of logical volumes (Column 2 Paragraph 10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to incorporate the teachings of McMichael et al. into Gioquindo et al. in order to fulfill the need for an OS that supports dynamic changes in the characteristics of physical devices underlying logical volumes without requiring higher layers of the OS and user applications to modify the addresses of logical volumes.

Gioquindo et al. in view of McMichael et al. does not specifically disclose *allowing the new partition to directly share the adapter with the other partitions*. However, Fernandes et al. discloses a method of sharing a network adapter among multiple logical partitions in which a first partition takes ownership as the host partition and other partitions that want to share the adapter have to register themselves with the first partition (i.e. *allowing the new partition to directly share the adapter*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to incorporate the teachings of Fernandes et al. into the system of Gioquindo et al. in view of McMichael et al. in order to allow partitions of a partitioned computer system to share a network adapter.

***Allowable Subject Matter***

22. Claims 5, 11, and 13-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to OTIS L. THOMPSON, JR whose telephone number is (571)270-1953. The examiner can normally be reached on Monday to Thursday 7:30 am to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chirag Shah can be reached on (571)272-3144. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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/Otis L Thompson, Jr./  
Examiner, Art Unit 2419

November 12, 2008

/Chirag G Shah/

Supervisory Patent Examiner, Art Unit 2419